

REMARKS

Status of Claims

Claims 10-25 are pending, of which claims 10, 24 and 25 are independent.

Claims 10-11 and 15-25 have been amended to correct informalities in the claim language and to more clearly define the present subject matter. Claim 10 has been amended to incorporate the subject matter of base claim 1 and to more clearly define the present subject matter. Claims 24 and 25 have been amended to incorporate the subject matter of original claim 10 with modifications. Support for the amendments is found, for example, at paragraphs [0074] and [0103] of the specification. Claims 1-9 have been cancelled without prejudice. Care has been taken to avoid introducing new matter.

Rejection under 35 U.S.C. § 112

Claims 1-25 were rejected under 35 U.S.C. § 112, first paragraph, as allegedly failing to comply with the written description requirement. Applicants respectfully submit that the amendment made to the claims overcome this rejection. Specifically, Applicants submit that the claim language regarding latency time has been removed.

Rejection under 35 U.S.C. § 103

Claims 1, 5-6 and 23-25 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Hobbs et al. (US 2002/0199178) in view of Santhanam (US 5,704,053). Claims 2, 7-14, 17-18 and 20-22 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Hobbs et al. in view of Santhanam, further in view of Nishiyama (US 6,148,439). Claims 3-4 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Hobbs et al. in view of Santhanam, and

further in view of Ogawa et al. (US 2004/0098713). Claims 15-16 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Hobbs et al. in view of Santhanam and Nishiyama, and further in view of Liu et al. (US 6,070,011). Claim 19 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Hobbs et al. in view of Santhanam and Nishiyama, and further in view of Ogawa et al. These rejections are traversed for at least the following reasons.

Since claims 1-9 have been cancelled, the rejections of claims 1-9 are moot.

Applicants respectfully submit that, at a minimum, none of the cited references discloses or suggests “*splitting off, from the loop whose iteration count is x, the loop whose iteration count is y, where $y = (\text{a cache line size}) / \{(\text{a size of an array referenced within the loop whose iteration count is } x) \times (\text{a value of an increment of the array})\}$,” as recited by independent claims 10, 24 and 25. In original claim 10, the split-off loop whose iteration count is y is defined as a loop “*which is executed in accordance with an advance in a cache line size made by an address of an array referenced within the loop whose iteration count is x.*” It should be noted that the limitations of original claim 10 have been rewritten into the above calculation to define y. For example, assume that the cache line size is 128 bytes and the size of an array is 4 bytes (see, for example, paragraph [0074] of the specification). Further assume that a stride which is a value of an increment of the array is 1 (see, paragraph [0103]). When the array is referenced within the loop whose iteration count is x (i.e., an outer loop), the address in the cache line advances by the array size (i.e., 4 bytes). In this case, the iteration count y of the loop to be split-off from the outer loop is $128/4=32$ (see, paragraph [0074]). In other words, such loop having the iteration count y (32) is executed in accordance with an advance in a cache line size made by an address of an array referenced within the loop whose iteration count is x. If the stride is 2, the address in*

the cache line would advance by $4 \times 2 = 8$ bytes (see, paragraph [0103]) and the iteration count y would be $128/(4 \times 2)=16$.

Turning to the cited references, in rejecting original claim 10, the Examiner concedes that Hobbs and Santhanam do not disclose the above identified features, and relies on Nishiyama asserting that Nishiyama discloses splitting off a loop at col. 3, lines 35-45. The cited portion of Nishiyama states as follows:

FIG. 15 typically shows a state of prefetching for nested loops containing two fraternal innermost loops. Each of the innermost loops constituting nested loops is split into a front half loop 1501 and a rear half loop 1502. In the front half loop, data used by the loop per se are prefetched (1503). In the rear half loop of the first loop in the two innermost loops, data to be referred to in the beginning of the second loop are prefetched (1504). In the rear half loop of the second innermost loop, data to be referred to in the beginning of the first loop in the next outer loop repetition are prefetched (1505).

This portion appears to disclose the step of splitting the innermost loop into a front half loop and a rear half loop. However, this portion of Nishiyama fails to disclose that the front half loop or the rear half loop (i.e., a loop split off) is executed in accordance with an advance in a cache line size made by an address of an array referenced within the loop whose iteration count is x . In other words, Nishiyama fails to disclose the iteration count y is calculated by " $y = (a \text{ cache line size}) / \{(a \text{ size of an array referenced within the loop whose iteration count is } x) \times (a \text{ value of an increment of the array})\}$," as recited by amended claims 10, 24 and 25. The remaining portion of Nishiyama also fails to disclose this feature of amended claims 10, 24 and 25.

As such, it is clear that Nishiyama fails to disclose "*splitting off, from the loop whose iteration count is x , the loop whose iteration count is y , where $y = (a \text{ cache line size}) / \{(a \text{ size of an array referenced within the loop whose iteration count is } x) \times (a \text{ value of an increment of the array})\}$* ," as recited by amended independent claims 10, 24 and 25. It is also clear that the

remaining cited references do not cure the deficiencies of Hobbs, Santhanam and Nishiyama, and it would not have been obvious to add these features to any combination of the cited references.

Accordingly, claims 10, 24 and 25, and all claims dependent thereon are patentable over the cited references. Thus, it is requested that the Examiner withdraw the rejections of claims 10-25 under 35 U.S.C. § 103(a).

CONCLUSION

Having fully responded to all matters raised in the Office Action, Applicants submit that all claims are in condition for allowance, an indication for which is respectfully solicited. If there are any outstanding issues that might be resolved by an interview or an Examiner's amendment, the Examiner is requested to call Applicants' attorney at the telephone number shown below.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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